TOSHIBA

Leading Innovation

V200 SERIES

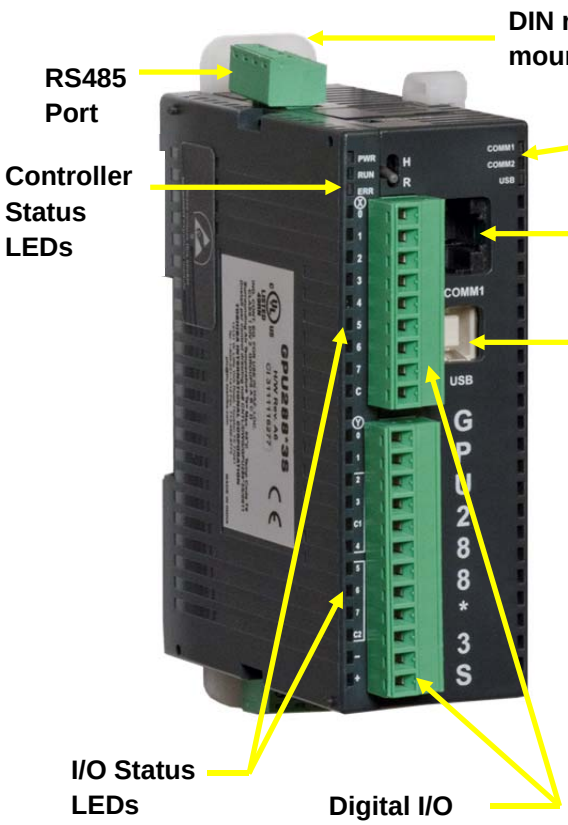
MICRO PROGRAMMABLE LOGIC CONTROLLER

Phone: 800.894.0412 - Fax: 888.723.4773 - Web: www.ctiautomation.net - Email: info@ctiautomation.net

CPU Modules

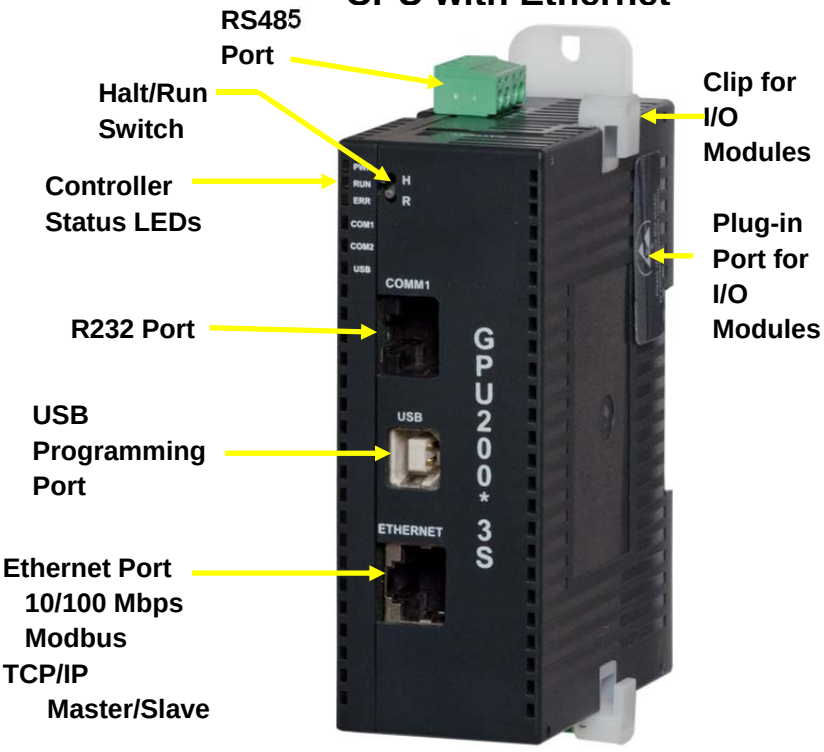
The V200 PLC's large memory (program and data register) make them ideally suited for applications previously requiring larger more expensive programmable controllers. The V200 PLC's high-speed performance makes them especially adept at sophisticated machine control applications. They also handle complex process applications requiring multiple recipes and reporting requirements.

CPU with I/O



Toshiba's V200 Series PLCs are small modular type controllers suitable for both relay replacement and complex control applications.

CPU with Ethernet



Advanced Features:

♦ Enhanced Instruction Set	♦ Interrupt I/O	♦ Floating Point Math
♦ Windows Prgm Sftw	♦ Clock/Calendar	♦ Log/Antilog
♦ Toshiba ASD Protocol	♦ Indirect Addressing	♦ High Speed I/O

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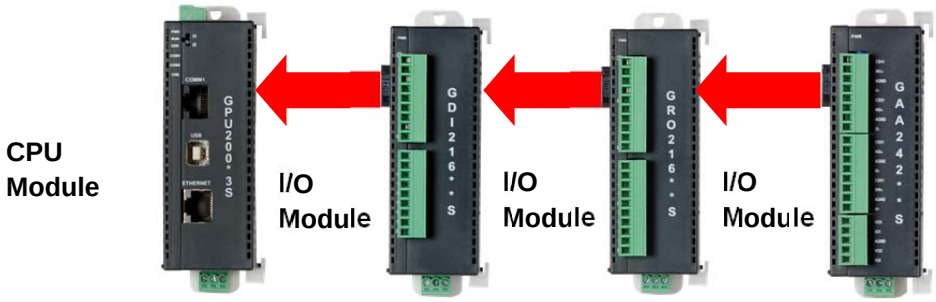
I/O Expansion

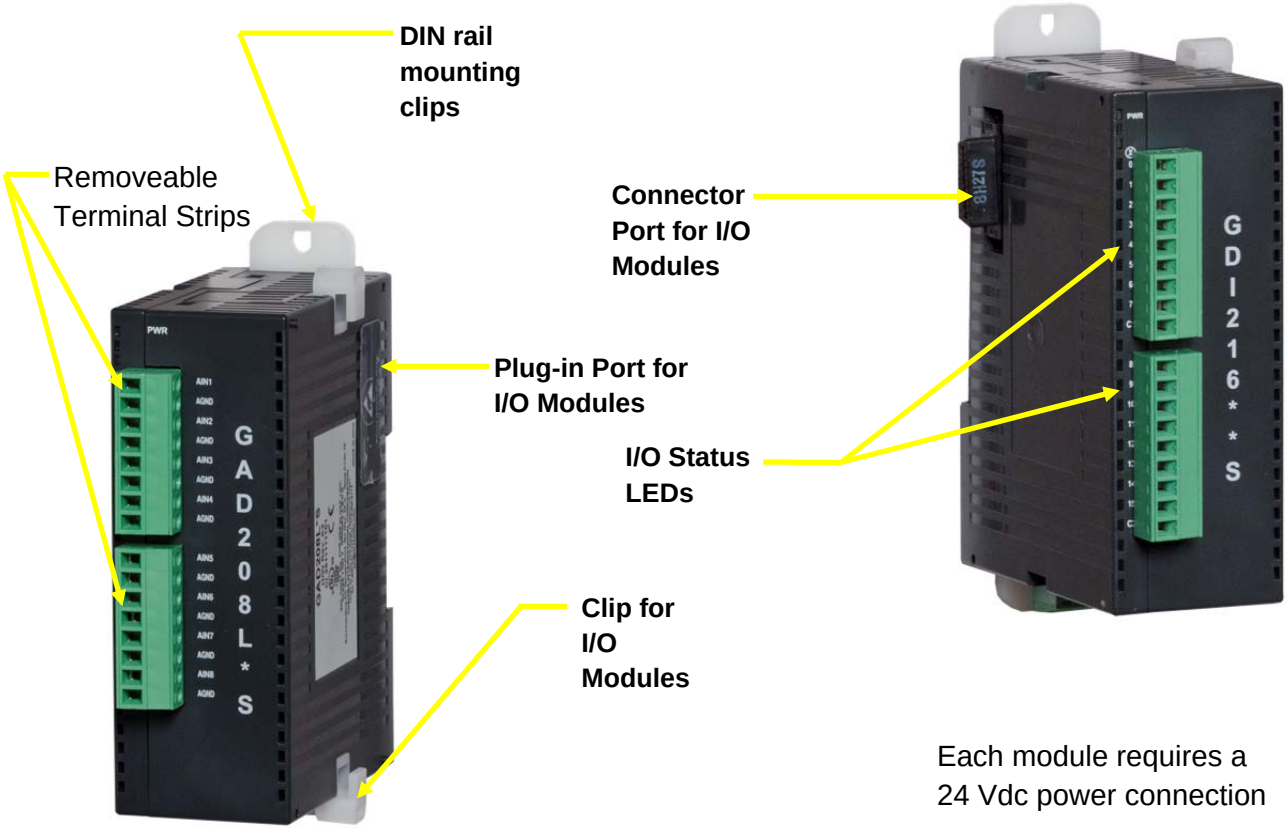
A complete complement of I/O modules are available for the V200 Series. These include 16 pt DC Input, 16 pt DC Output, 16 pt Relay Output, Analog, Thermocouple, & RTD Inputs, and Analog Output modules. Up to 8 I/O modules can be connected to each CPU module.

CPU with 8 Expansion I/O Modules



I/O Modules can be connected to the CPU module in any order and any mix of discrete and analog.

Max Discrete I/O = 144 points (128 points if using Ethernet CPU)
Max Analog I/O ≈ 56 channels (2 to 1 mix of AI and AO)
Max I/O Expansion Modules = 8



Each module requires a 24 Vdc power connection

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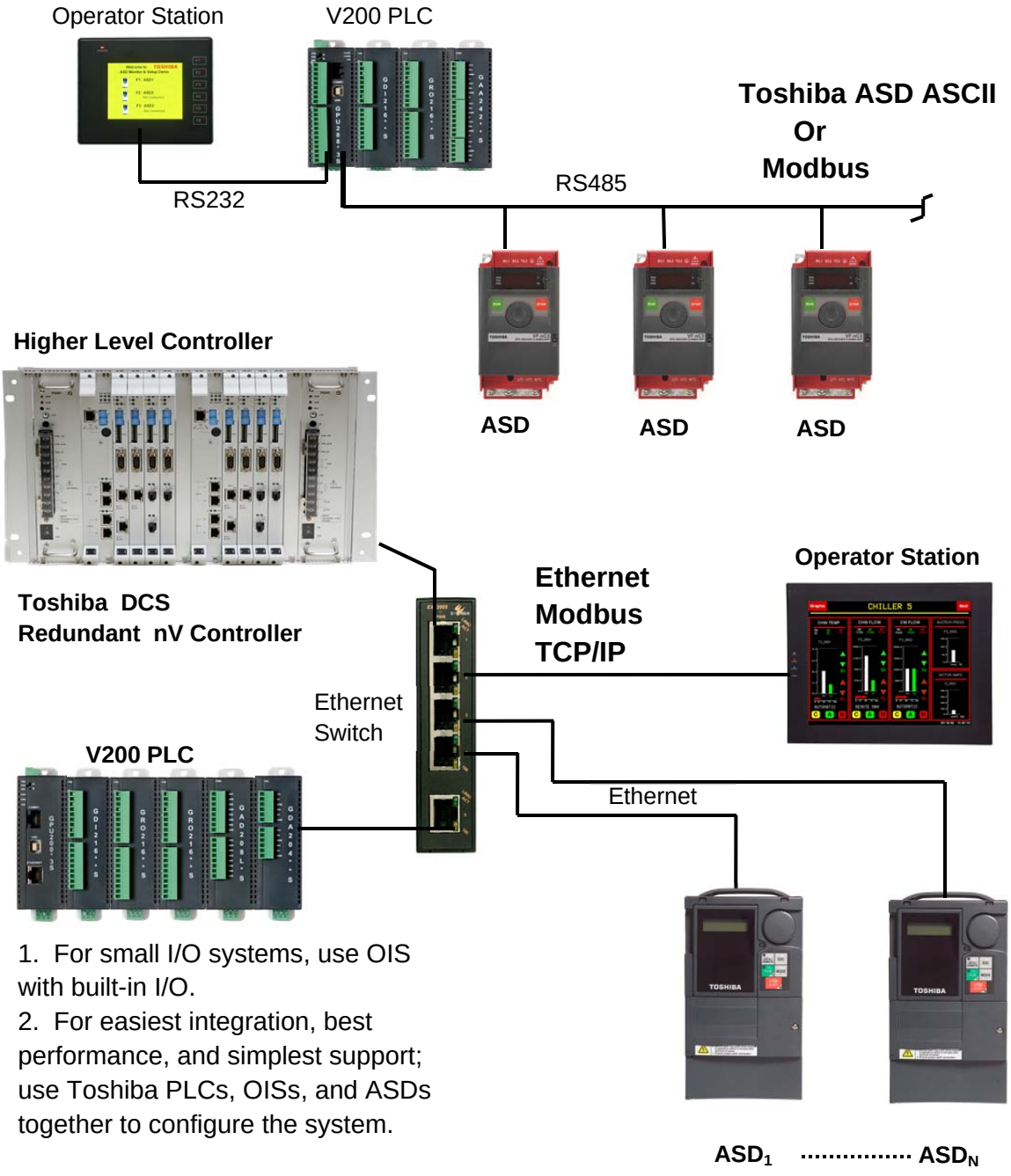
Networking

PLCs do not work alone. They must collect data and status from all the equipment they control and they must be able to pass this information on to higher level controllers. The V200 can do this as well as pass information back from the high level controllers to the equipment the V200 controls. The following protocols are built-into the V200 CPUs:

- Toshiba PLC ASCII
- Modbus, Master/Slave
- Toshiba ASD ASCII
- Ethernet Modbus TCP/IP



1. For small I/O systems, use OIS with built-in I/O.
2. For easiest integration, best performance, and simplest support; use Toshiba PLCs, OISs, and ASDs together to configure the system.

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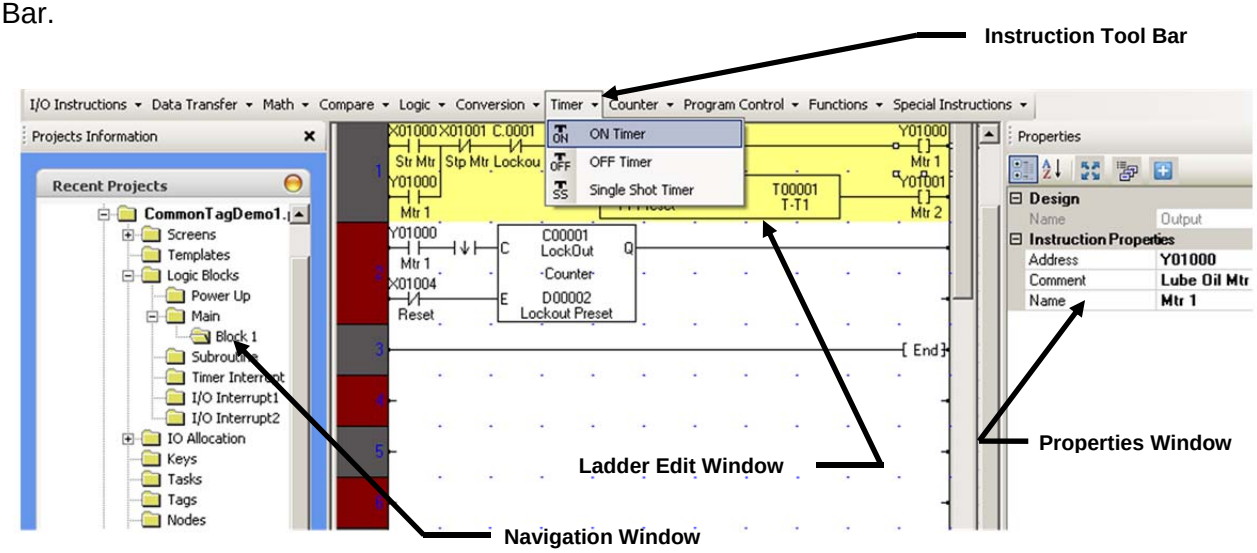
Programming Software

The V200 Series PLC is programmed with the OIL-DS software, the same software used by the OIS (Operator Interface Stations). Thus a common tag database can be used by both the PLC and the OIS

Main Window

When the software is started the main window opens. The main window consists of a Navigation Window, a Ladder Edit Window, and a Properties Window. On top is the Instruction Tool Bar.



User's of the T-PDS programming software will find that the instructions (counters, comparisons, move, etc) work just the same as they do in the T1 Series PLCs. The OIL-DS software has:

- ►A Full-Featured Program Editor, including Cut, Paste, Search, Replace, Insert, & Delete.
- ►Common Tag Data Base for Operator Display and internal PLC Ladder
- ►Group Programming with Block Merge.
- ►On-line Power Flow Monitor
- ►Program Documentation w/Tags & Comments.
- ►Print Map Options (usage, x-ref, etc).
- ►I/O Force ON/OFF from Computer Keyboard.

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Instruction Set

Along with reliable hardware, solid software, and good peripherals; a comprehensive instruction set is also necessary. Toshiba's many years of experience in machine control, process control, and motion control has resulted in a full featured instruction set for the V200 Series PLCs (the same as T1 Series). Instructions include:

Standard Ladder Instructions:
- NO, NC, & Transitional Contacts
- Coils, Timers, & Counters

Data Transfer Instructions
- MOV, Table Initialize, Table MOV
- Data Exchange, Multiplexer, Demultiplexer

Logical Instructions: AND, OR, Exclusive OR, Bit Test

Shift Instructions:
- 1 Bit Shift (right/left), n Bits Shift (right/left)
- Shift Register, Bi-directional Shift Register

Math Instructions:
- Single & Double Register Add, Subtract, Divide,& Multiply
- Increment, Decrement, Log & Antilog

Data Compare Instructions:
- Greater Than, Greater Than or Equal, Equal
- Less Than, Less Than or Equal, Not Equal

Data Conversion Instructions:
- Integer to Float, Float to Integer, Double Length to Float, Float to Double Length Integer, HEX to ASCII, ASCII to HEX, 2's Complement Double Length 2's Complement, 7-Segment Decode Conversion to ASCII/Binary/BCD

Program Control Instructions:
- Subroutine Call/Return, FOR/NEXT, Interrupt Enable/Disable, Interrupt Return Step Sequence Initialize/Input/Output, Master Control Set/Reset Jump Control Set/Reset

Special Process Instructions:
- Moving Average, Digital Filter, PID, Limit Upper/Lower, Max/Min/Avg Value, Function Generator, Special Module Read/Write

Note: For a complete list of all instructions and explanation of operation, please see help menu in the OIS-DS software.

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Other Features

Address	Value	Binary Value	Data Type	Data Size
XW0000	000000	0000000000000000	Signed	2 bytes
Y00000	000000	0000000000000000	-	-
D00000	000000	0000000000000000	Unsigned	2 bytes
D00001	000000	0000000000000000	Unsigned	2 bytes
C.0000	000000	0000000000000000	-	-

Data Monitor Window allows different register types to be grouped together: Register values, bit status, data type, and data size are viewable.

Simple Computer Connection

Connect to any computer no matter what its age.

New Computer

Use a standard off the shelf USB Printer Cable

Old Computer

Use the Toshiba Serial 9 Pin D-shell to RJ45 Cable

The computer must have the following minimum capabilities:

Item	Specification
Computer:	Toshiba Notebook or PC Compatible.
Operating System:	Windows 2000 w/SP4 or higher.
CPU:	800 Mhz Pentium or Equivalent.
RAM:	256 Mb or more.
Hard Disk:	1 Gb
Display:	800 x 600 pixels with 256 Colors.
Com Ports:	USB or Serial Port (for prgm download/upload).
Pointing Device:	Mouse or Equivalent
Input Devices:	Keypad
	CD-ROM or DVD Drive (for prgm installation).

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Peripherals

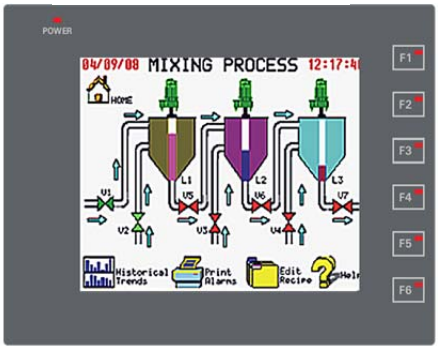
OIS12

Keypad Display

Inexpensive 2 line x 16 character display with keypad for simple data entry

OIS55 PLUS

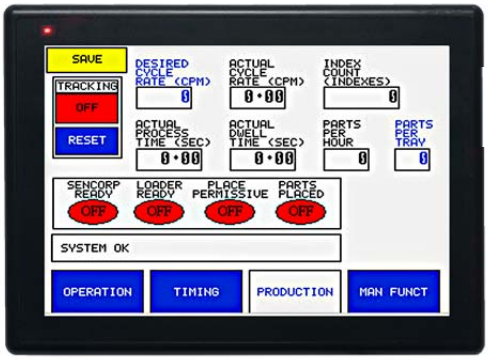
Color Touchscreen



Inexpensive 3 ½ inch color touchscreen with 6 function keys and 6 alarm/indicaton LEDs.

OIS70E PLUS

Keypad Display



7 inch color touchscreen with Ethernet

All OIS PLUS displays use the same OIL-DS programming software as the V200 PLCs.

Do not use these peripherals with the V200 Series PLC.

RM102 EEPROM Module

OIS10 & OIS15 Displays

HP911 Dedicated Programmer

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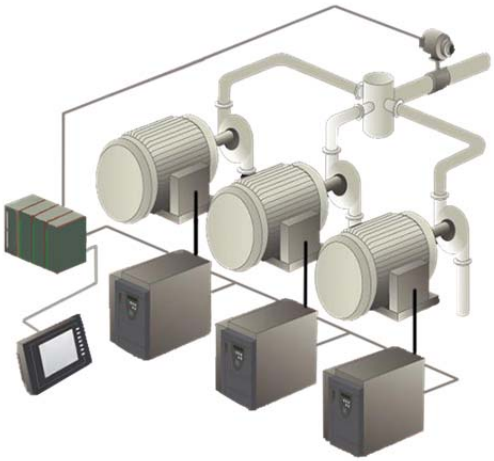
Typical Applications

Multiple Pump Control



Application: Multiple pumps feeding a common header.
Requirement: Configure most energy efficient system possible. Use Toshiba ASDs (adjustable speed drives) and motors so that all pumps make equal contribution to the header (no wasted energy from one pump competing against another).

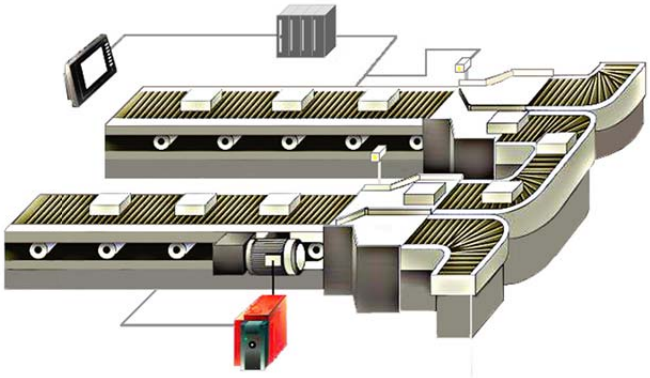
Toshiba Equipment:

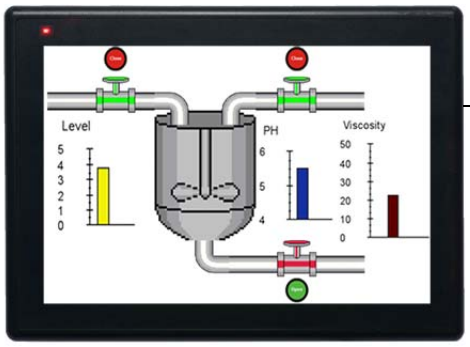
- PLC--V200 Series
- ASD-- S11/AS1
- Display--OIS60 PLUS
- Motor--World Energy 21 Series
- Magnetic Flow Meter--LF470

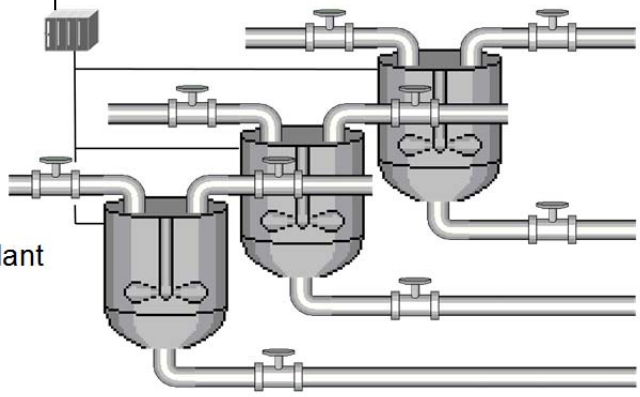
Application: High speed conveyor control.
Requirement: Configure high speed conveyor control system. Use Toshiba ASDs (adjustable speed drives) and motors so each package is inspected and routed to correct destination.

Toshiba Equipment:

- PLC--V200 Series
- ASD-- S11/AS1
- Display--OIS60 PLUS
- Motor--World Energy 21 Series







Application: Mixing tank control.
Requirement: Control individual mixers in chemical plant

Toshiba Equipment:

- PLC--V200 Series
- ASD—G9 ASD
- Display—OIS70 PLUS

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SPECIFICATIONS

General Specifications

Item	Specification
Operation Temperature	0 to 55°C
Storage Temperature	-20 to 85°C
Humidity	10 to 90%RH (no condensation)
Dust	10 mg/m^3 or less
Atmosphere	UL Class 1 Div 2
Vibration Immunity	IEC61131-2 (10 to 150 Hz, 9.8m/s^2)
Shock Immunity	IEC61131-2 (150m/s^2)
Noise Immunity	Power impulse: 600 Vp-p 1μs ESD: 8kV EMC directive
Insulation Resistance	5 MΩ or more (between external and internal circuits)
Withstand voltage	600 Vac for 1 minute
Fast Transient Burst	IEC61000-4-4
Electrostatic Discharge	IEC61000-4-2 Level 3
Electromagnetic Field	IEC61000-4-3
RF Immunity	IEC61000-4-6
Dumped Oscillatory Wave	IEC61000-4-12
Surge Immunity	IEC61000-4-5 Level 2
Radiated Emission	EN50081-2: EN55011:1998 + A1: 1999 + A2: 2009:2010
Grounding	100Ω or less (type D grounding)
Cooling	Natural air cooling
Certifications	UL, cUL, CE

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Functional Specifications

Item		Specification
Control Method		Stored program, cyclic scan system
Scan System		Floating scan
I/O Update		Batch I/O refresh (direct I/O instruction available)
Program Memory		Stored in flash memory (ROM)
Program Capacity		8 K steps
Programming Language		Ladder diagram with function block.
Instructions		Basic: 20 Function: 96
Execution Speed		1.4 µs/contact, 2.3 µs/coil, 4.2 µs/16-bit transfer, 6.5 µs/16-bit addition
Program Types		1 Main program
		1 Sub-program (initial program)
		1 Timer interrupt (interval: 5 to 1000ms, 5ms units)
		2 I/O interrupt (high-speed counter and interrupt input)
		256 Subroutines
User Data	I/O	6400 Points/400 registers (X/XW, Y/YW) max
	Auxiliary	4096 Points/256 registers (B/BW)
	Special	4096 Points/256 words (S/SW)
	Timer	256 Registers (T./T), 64 @ 0.01s & 192 @ 0.1s
	Counter	256 Registers (C./C)
	Data	4096 Registers (D)
	Retentive	1400 Registers (RW)
	Configuration	25600 Points/1600 Registers (M/MW)
	Index Register	3 Words (I, J, K)
Real-Time Clock/Calendar		Year, month, day, day of the week, hours, minutes, seconds
Special I/O Functions		High speed counter (2 single or 1 quadrature) or Interrupt input (2 points), Pulse output (CW+CCW or Pulse+Direction) or PWM output
Debug Support Functions		On-line monitor

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CPU Specifications

Specification			GPU200	GPU288
Power Supply			24 Vdc, (+10%, -15%)	24 Vdc, (+10%, -15%)
Power Consumption			3.6 VA or less, no exp. I/O	8 VA or less, no exp. I/O
Memory			8 k Steps	8 k Steps
Communication Ports			Programming USB Serial RS232, RS485 Ethernet (10/100 Mbps)	Programming USB Serial RS232, RS485
Local I/O			None	8 Inputs, 8 Outputs
Inputs	DC Input	Input Points		8 points (8 points/common)
		Rated Input Voltage		24Vdc, +10/-15 %
		Rated Input Current		5mA . 20 mA for HS Iputs
		Min. ON Voltage		9.6 Vdc
		Max. OFF Voltage		3.6 Vdc
		ON/OFF Delay		10 ms
Outputs	Rly Output	Output Points		6 Relay,
		Rated Load Voltage		240Vac.2A 24 Vdc/0.5A
		Max. Load Current		2A/point (resistive), 6A/common
		Leak Current at OFF		None
		ON/OFF Delay		10 ms or less
	DC Output	Output Points		2 points (2 points/common)
		Rated Load Voltage		24Vdc
		Max. Load Current		0.5A/point (resistive)
		Leak Current at Off		0.1mA or less
		ON/OFF Time		1ms or less
Special I/O HS Counter PWM Output				2 1φ (50 Khz), 1 Quad (5 Khz) CW/CCW or PLS/Dir
Max Expansion			8 I/O Modules	8 I/O Modules
External Connection				Removable Terminal Blocks
Cooling			Natural air cooling	Natural air cooling
Mechanical Dimensions			100 mm x 35 mm x 70 mm	100 mm x 35 mm x 70 mm
Weight			125 gm	180 gm

Notes: 1. GPU200 has no I/O on the CPU Module.
2. I/O modules require additional 24 Vdc power.

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Digital I/O Specifications

	Specification	GDI216	GDO216N	GDO216P	GRO216
Inputs	Input Type	DC input,			-
	Input Points	16 points, bidirectional			
	Rated Input Voltage	24Vdc, +10/-15%			
	Rated Input Current	5mA			
	Min. ON Voltage	9.6 Vdc			
	Max. OFF Voltage	3.6 Vdc			
	ON/OFF Delay Time	10ms or less			
	Isolation	Optical			
Outputs	Output Type		DC Output	DC Output	Relay Output
	Output Points		16p, NPN	16p, PNP	16p
	Outputs/Common		4 points/com	4 points/com	4 points/com
	Rated Load Voltage		24Vdc, +10/-15%	24Vdc, +10/-15%	30 Vdc – 240 Vac
	Max. Input Current		0.5A/point	0.5A/point	2 A/point
	Leak Current at OFF		0.1mA or less	0.1mA or less	None
	ON/OFF Delay Time		1ms/2ms or less	1ms/2ms or less	10ms or less
External Connection		Removeable TB	Removeable TB	Removeable TB	Removeable TB
Max Current @ 24 Vdc		80 mA	80 mA	80 mA	260 mA
Weight		125 gm	120 gm	120 gm	180 gm

	Specification	GDR288	GDD288N	GDD288P	
Inputs	Input Type	DC input,	DC Input	DC Input	-
	Input Points	8 points, bidirectional	8 points, bidirectional	8 points, bidirectional	
	Rated Input Voltage	24Vdc, +10/-15%	24Vdc, +10/-15%	24Vdc, +10/-15%	
	Rated Input Current	5mA	5mA	5mA	
	Min. ON Voltage	9.6 Vdc	9.6 Vdc	9.6 Vdc	
	Max. OFF Voltage	3.6 Vdc	3.6 Vdc	3.6 Vdc	
	ON/OFF Delay Time	1 ms or less	1 ms or less	1 ms or less	
	Isolation	Optical	Optical	Optical	
Outputs	Output Type	Relay Output	Transistor Output	Transistor Output	
	Output Points	8	8 points, NPN	8 points, PNP	
	Outputs /Common	4 points/com	4 points/com	4 points/com	
	Rated Load Voltage	5 Vdc – 240 Vac	30 Vdc	30 Vdc	
	Max. Load Current	2 A/point	0.5 A/point	0.5 A/point	
	Leak Current at OFF	None	100 µA or less	100 µA or less	
	ON/OFF Delay Time	10 ms or less	1 ms or less	1 ms or less	
External Connection		Removeable TB	Removeable TB	Removeable TB	
Max Current @ 24 Vdc		200 mA	50 mA	50 mA	
Weight		160 gm	120 gm	120 gm	

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Analog I/O Specifications

Specification		GAD208L	GAA242	GDA204
Inputs	Input Type	Analog	Universal Analog	
	Input Points	8 Channels,	4 Channels, Universal	
	Input Signal	0-10 Vdc,(1 kΩ min load) 4-20 mA (500 Ω max load)	0-10 Vdc, 0-20 mA, 4-20 ma, RTD PT 100 (α1 & α2), TC (B,R,S,E,J,K,N,T), 0-100 mV, 0-50 mV.	
	Resolution	16 Bit	16 Bit	
	Accuracy	0.2% at Full Scale	0.2% at Full Scale	
	Temp Drift	60 ppm		
	Conversion Cycle			
	Isolation	Only Between Modules/Backplane	Only Between Modules/Backplane	
Outputs	Output Type		Analog	Analog
	Output Points		2 Channels	4 Channels
	Output Voltage		0-10 Vdc (1 kΩ min load)	0-10 Vdc,(1 kΩ min load)
	Output Current		4-20 mA (500 Ω (max load)	4-20 mA (500 Ω max load)
	Resolution		16 Bit	16 bit
	Accuracy		0.2% Full Scale	0.2% Full Scale
	Conversion Cycle			
External Connection		Removeable TB	Removeable TB	
Max Current @ 24 Vdc		150 mA	200 mA	160 mA
Weight		155 gm	155 gm	155 gm

Special I/O (under development)

Specification		
Inputs	Input Type	
	Input Points	
	Rated Input Voltage	
	Rated Input Current	
	Min. ON Voltage	
	Max. OFF Voltage	
	ON/OFF Delay Time	
	ON/OFF Delay Time HS	
	Isolation	
Outputs		
	Output Type	
	Output Points	
	Rated Load Voltage	
	Rated Load Voltage	
	Max. Load Current	
	Leak Current at OFF	
	ON/OFF Delay Time	
External Connection		
Max Current @ 24 Vdc		
Weight		

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ORDER NUMBERS

TIC_NO	DESCRIPTION
	CPUs
GPU288*3S	V200 CPU, 8 Inputs 24 Vdc, 2 Outputs 24 Vdc Transistor, 6 Outputs Relay, Requires 24 Vdc PS.
GPU200*3S	V200 CPU, Ethernet & USB Port, Requires 24 Vdc PS.
	I/O Modules
GDI216**S	16 Inputs, 24 Vdc, 8p/com, sink/source
GDR288**S	8 Inputs, 24 Vdc. 4p/com, 8 Outputs Relay, 4p/com
GDD288P*S	8 Inputs, 24 Vdc. 4p/com, 8 Outputs PNP, 4p/com
GDD288*S	8 Inputs, 24 Vdc. 4p/com, 8 Outputs NPN, 4p/com
GRO216**S	16 Outputs Relay, 8p/com
GDO216P*S	16 Outputs, 24 Vdc Transistor, 8p/com, PNP
GDO216*S	16 Outputs, 24 Vdc Transistor, 8p/com, NPN
GAD208L*S	8 Analog Inputs, 4-20 mA, 0-10 Vdc (12 bit)
GAA242**S	4 Analog Selectable Inputs, 4-20 ma, 0-10 Vdc, 0-50/100 mV, RTD, TC -- 2 Analog Outputs, 4-20 mA, 0-10 Vdc.
GDA204**S	4 Analog Outputs, 4-20 ma, 0-10 Vdc.

Notes: 1. More analog and communications modules under development.
2. See OIS PLUS brochure for OIS PLUS part numbers.

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